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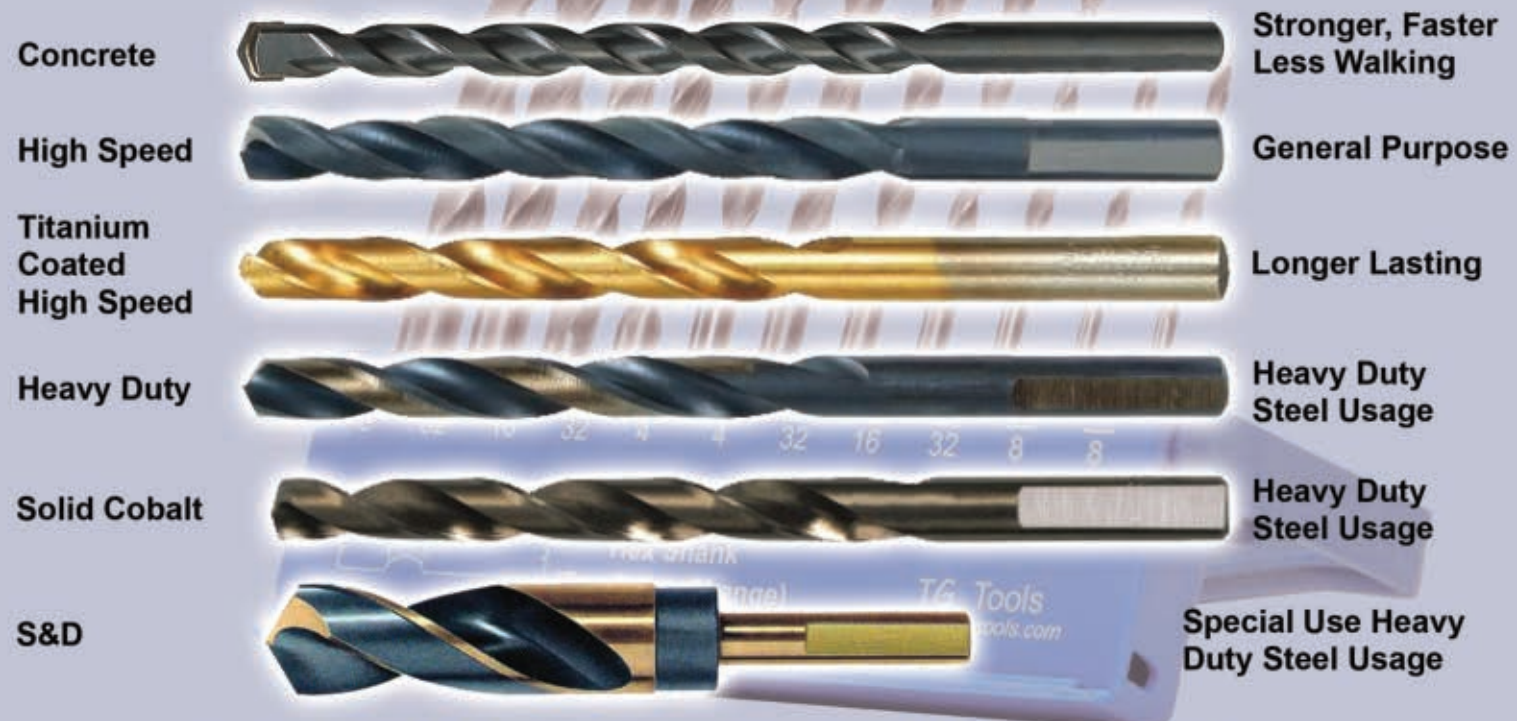

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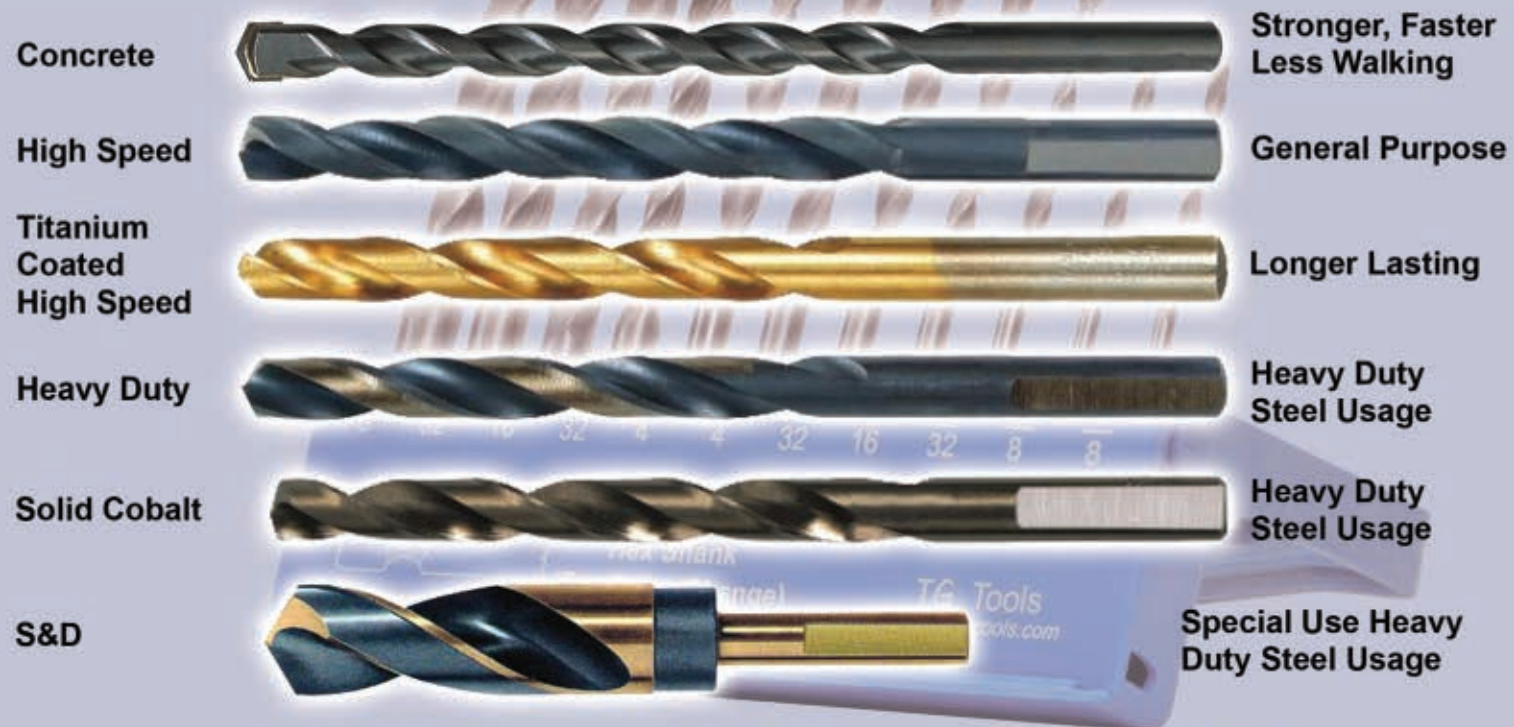

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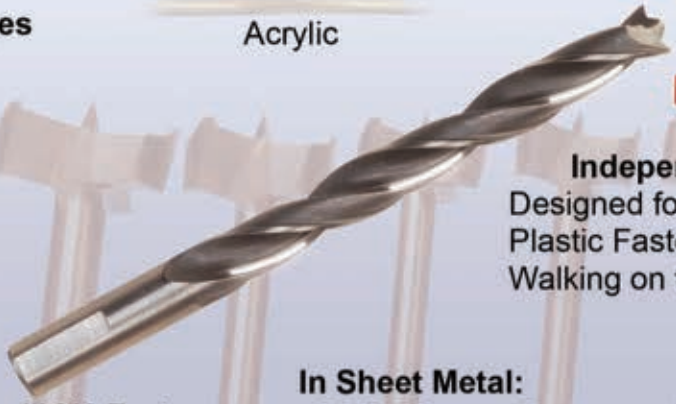

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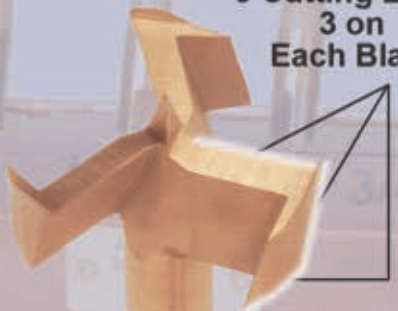

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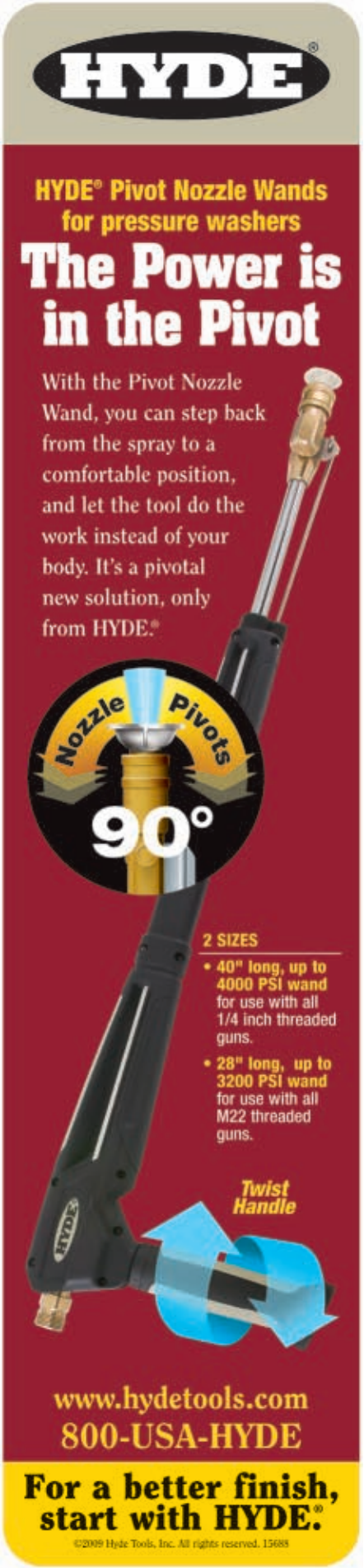
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LETTER *From The Editor-In-Chief*

Conserving energy not only helps the environment as well as reduces power bills, but with the latest government tax incentives, now is an excellent time to save even more money with qualifying home-improvements. From new windows to the most modern alternative heating systems, the Fed is offering some enticing monetary "carrots" to move the country toward a more sustainable and eco-friendly lifestyle.

If you live in an existing home, tax credits are available at 30 percent of the cost, up to $1,500, for the installation of qualifying windows and doors, insulation, roofs (metal and asphalt), HVAC systems, non-solar water heaters and biomass stoves. There are, of course, stipulations to qualify. For example, not all of the government's ENERGY STAR-labeled windows and doors qualify for the tax credit. For more specific information on which models qualify, visit www.energystar.gov. And, to qualify for the tax credit, these improvements must be "placed in service" from January 1, 2009 through December 31, 2010, so act fast.

However, for certain energy-efficient improvements the tax credit program doesn't end there, nor is it limited to existing homes. For both new construction and existing homes, tax credits are available at 30 percent of the cost, *with no upper limit through 2016*, for utilizing such technologies as geothermal heat pumps, solar panels, solar water heaters, small wind energy systems and even fuel cells.

As you make the improvements, remember to save your receipts as well as the Manufacturer's Certification Statement, so you'll have all the necessary paper work when it's time to file taxes. This is a great way to put some of your hard-earned cash to work for you and your family, rather than sending more revenue to the netherworld of the IRS.

In this issue of *Extreme How-To*, we cover some of the newer alternative heating systems on the market, many of which qualify for the tax credits. We also explore the basics of a more traditional, renewable method—burning wood to heat your home. Thanks for reading, and stay warm this winter.

Extreme How-To

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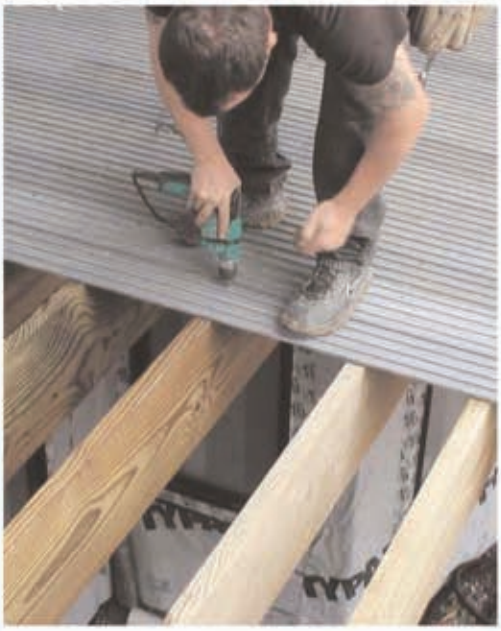

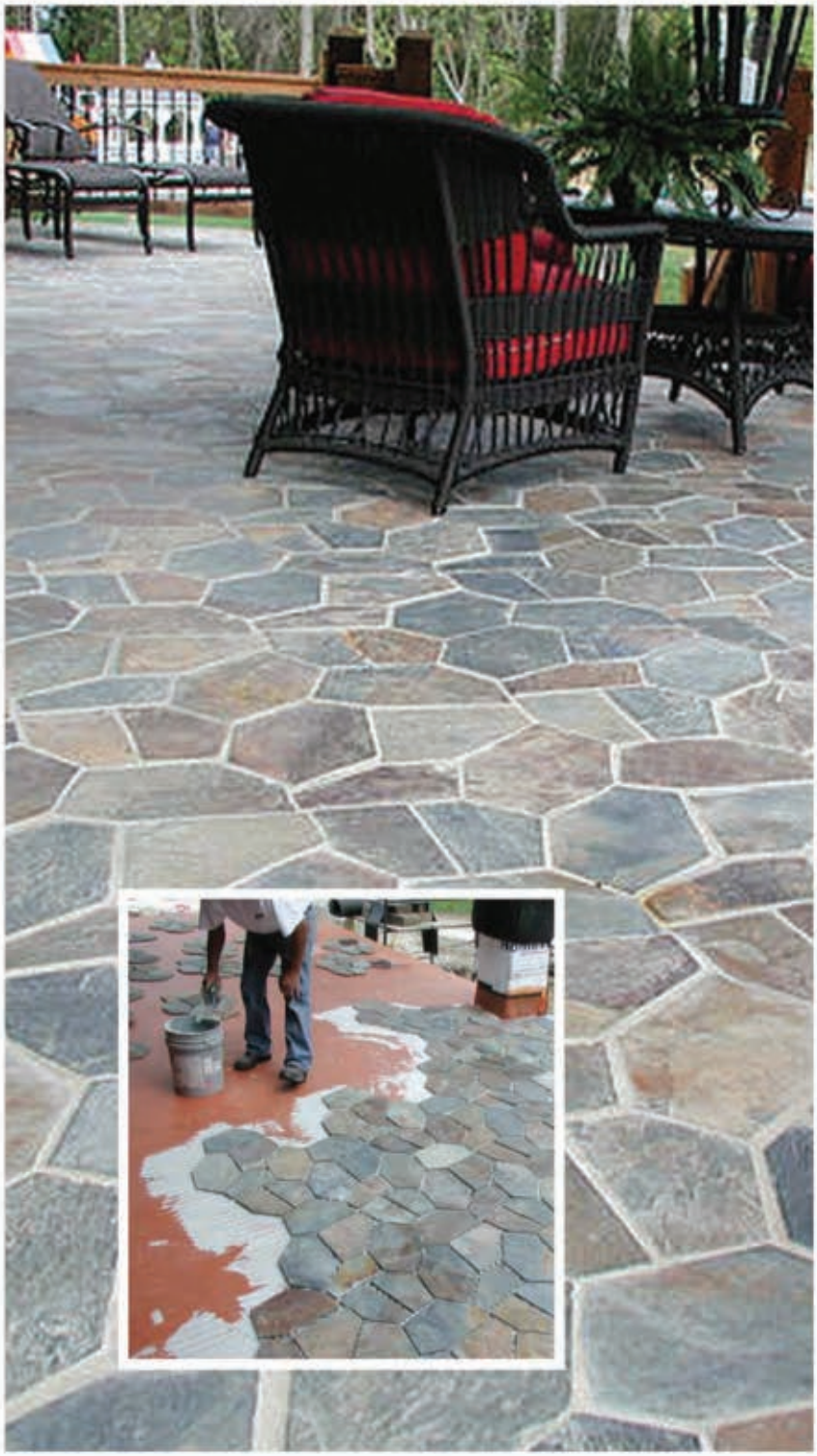

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Q. *My air conditioning unit has quit working. How do I know if it's better to repair or replace it?*

A. Repairs on the existing unit may be the least expensive immediate option, but could cost the more in the long run because older systems tend to break down repeatedly and consume more energy. However, there are some simple repairs that can prolong the life of an air conditioner. To determine if you should repair or replace, consider the following:

Is the air conditioner on its last leg? If the unit is more than 10 years old, replacing the system with a new ENERGY STAR-qualified system can save time, money and hassle. If the system is less than 10 years old, routine maintenance is almost always the way to go.

Are your energy bills steadily increasing? According to the experts at Lennox Industries, by replacing an old 8 SEER (seasonal energy efficiency rating) cooling system, with a 15 SEER system, homeowners can save approximately 47 percent on energy bills and up to $3,095 over a five-year period.

Is the refrigerant used in the air conditioner on the verge of extinction? Most older systems use a refrigerant known as Freon (also known as R-22). Because Freon has been found to be ozone-depleting, the EPA's Clean Air Act mandates that new air conditioning systems manufactured after 2010 use an environmentally friendly substitute like the chlorine-free and ozone-responsible R410A refrigerant. With the switch to R410A, the availability of Freon will eventually dwindle, and the cost will likely increase due to limited supplies.

Did your home feel like a sauna even before the air conditioner stopped working? A poorly operating air conditioner, or one that is not properly sized for the home, can contribute to excessive humidity. Leaky ductwork can also cause this. Talk with a reputable HVAC contractor to determine if you need to replace the system with one that is the right size, or if the issue can be resolved with repairs or duct sealing.

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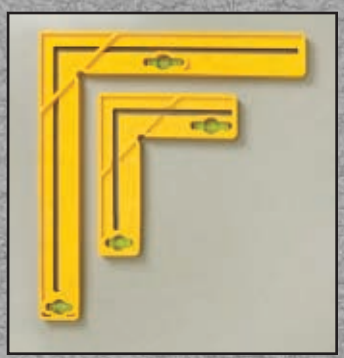

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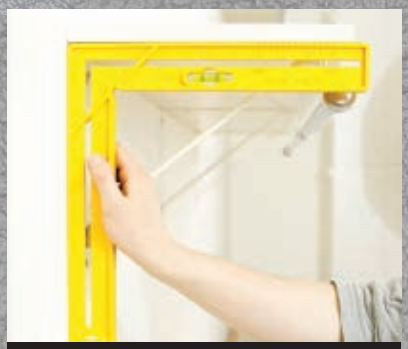

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Q: *How do I fix a flickering lamp?*

A: First, make sure the bulb is tightly screwed down into the socket so there's no loose connection. If that doesn't work, unplug the lamp and look for any fraying on the cord near the plug. If the cord looks good and doesn't require replacement, then although the bulb is screwed tightly, it is still probably not touching the metal contact tab at the bottom of the lamp socket. Try removing the bulb and using a flathead screwdriver to pry the metal tab about 1/8-inch off the bottom of the lamp socket. Use the screwdriver to scrape away any rust or debris from the contact pint. Replace the bulb and test the lamp. If the light still flickers, the lamp probably has a faulty socket, switch or power cord.

Q: *How do I repair cracked, damaged stucco from around a window?*

A: Home-improvement stores sell premixed dry stucco in bags just like concrete. Chisel out the damaged areas of existing stucco and cut away the old metal lath from the wall. Reapply new metal lath to the wall, cutting it to overlap the old lath by 2 inches and fastening it with roofing nails. Mix the stucco with water according the package's instructions. Trowel on a scratch coat over the lath about 3/8-inch thick. As it starts to set, use a straight piece of lath to comb ridges in the scratch coat. Next, trowel on the second coat until it's flush with the existing stucco. Feather out the second coat with a wet sponge float so it blends with the rest of the stucco wall. Then, use the edge of a trowel to knock down the stucco so it matches the existing house texture. **EHT**

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The Right Stuff

The Latest News on Caulks and Adhesives

Advanced material technology makes the latest sealants more adhesive, durable and easier to use.

By Matt Weber

Visit a home supply store and you'll find many different caulks for many different jobs, but it's important to sort out the differences. When properly applied, a top-quality sealant helps provide a watertight and airtight seal to increase energy efficiency and protect the entire home from moisture damage. The right caulk can provide years of low-maintenance performance, but the wrong one can fail to seal or even serve as a breeding ground for mildew.

For example, a common gripe about bathtubs and showers is the dark mildew stains that often appear along the joints. The mildew is probably due to using the wrong type of caulk in a wet environment. Check the store for the variety of caulks labeled explicitly for "tub and shower" or "tub and tile." These "tub and shower" caulks are likely silicone-based, which makes them ideal for damp situations. Silicone sealants are flexible when they dry and often contain a mildewcide. Pick up one of these products for a bathtub job, but do not save the rest to use in your kitchen if it contains mildewcide. The mildewcide is a poison that shouldn't be used around food, drinking water or in dishwashers. This is why it's important to always check the label for instructions.

Silicone is the ingredient that serves as a selling point for many sealant products. Unlike acrylic latex caulk, 100-percent silicone is waterproof as long as it remains adhered to the substrate. Water cannot get through it or break it down. Once cured, there is no shrinking, hardening, cracking or crumbling. Even extreme temperatures, which often cause acrylic caulk to lose flexibility and degrade over time, do not affect silicone.

Silicone is also shrink-proof and flexible once it has cured, so it stretches and compresses with joint movement as a house moves and settles. This eliminates hardened acrylic caulk that can break over time, leaving gaps for air and water to pass.

Given all the benefits of silicone, you might wonder why acrylic latex caulk is still going strong. If water isn't an issue and you plan to paint over the caulk, then acrylic is a better choice. For indoor jobs, acrylic caulk has some big benefits going for it: namely, affordability, workability and paintability. Acrylic caulk is usually half the price of the silicone variety, which amounts to major cost savings on large projects.

Acrylic caulk can also be easier to work with because it isn't nearly as sticky as silicone. A quality acrylic caulk applies smoothly and easily, and you can

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run your finger over the bead to shape it without covering yourself in a gooey, viscous mess that refuses to wash off. Instead, a good acrylic caulk will wash off with water and work more like cake frosting than glue, preventing the "rabbit in a tar pit" effect.

The cleanup factor is why many manufacturers' claims of an "all-purpose" siliconized caulk can be misleading. I suppose it's true that the silicone variety can potentially be used anywhere, but the extra time and work involved in the cleanup makes the product impractical for large, interior jobs where waterproofing isn't necessary. And when I say cleanup, I don't mean cleaning once at the end of the job. The cleanup for silicone will likely require many repeat trips to the sink to wash up during application, because if you don't immediately use mineral spirits to remove the silicone, you will soon be coated with cured sealant—and you practically have to sand-blast the stuff off.

Sashco's MildewFree Sealant is the first tub and tile caulk to offer a one-of-a-kind replacement guarantee. If mildew growth occurs on the sealant (not on soap film), within seven years of purchase, Sashco will replace the product and provide a contractor for re-installation.

Another important factor is that acrylic caulk is paintable, and thus is commonly called "painter's caulk." Although a few of the newest formulations of silicone sealants are advertised as paintable, paint typically will not adhere to silicone. Again, be sure to check the packaging for recommended usage. Silicone sealants are usually sold in white or clear, but some manufacturers now offer black, bronze, almond, gray or cedar.

Also available are hybrid caulks, such as DAP's Alex Plus

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Acrylic caulk works great for interior applications that need to be painted. In this photo we're caulking a baseboard with one of DAP's new Pro Caulk tools.

Acrylic Latex Caulk Plus Silicone. The silicone adds flexibility and durability while the caulk remains paintable and easy to clean up.

ADVANCED FORMULAS

As technology advances, several manufacturers are moving away from standard acrylic and silicone toward new sealant formulations that offer better workability, extra durability and more functionality.

One such popular caulking category among pros and DIY'ers is the multipurpose caulks called "adhesive caulks," such as the Polyseamseal product line from Henkel. Adhesive caulks function just like they sound, serving as both a joint-sealing caulk and a light-duty construction glue that offers excellent adhesion to a wide range of surfaces. Polyseamseal is available as a silicone-based product as well as a water-based acrylic for easier cleanup. These products do a good job of serving double duty, but expect to pay for the adhesive functionality.

Red Devil has a multipurpose caulk called King Caulk, billed as a three-in-one product that also serves as caulk, sealant and adhesive. King Kaulk is a hybrid polymer sealant that grabs onto surfaces quickly, bonding permanently like strong

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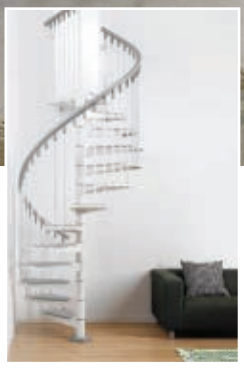
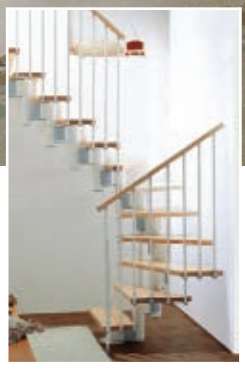
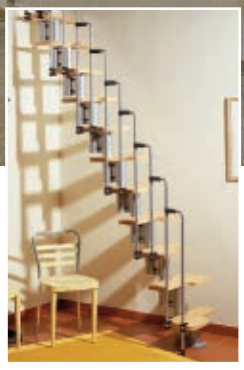

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glue. It forms a flexible, watertight seal that won't shrink or crack. King Kaulk is paintable, easy to tool and finish, and has low VOC and virtually no odor. When cured, it resists harsh weather conditions, UV rays and mildew. King Kaulk is more expensive than competitive products, but it does the job of three products: It caulks tubs, showers and countertops. It seals windows, doors and gutters. And, it bonds wood, concrete, brick, metals and plastics.

King Caulk is a three-in-one product that serves as caulk, sealant and adhesive.

Sashco offers a multipurpose co-polymer rubber-based sealant called Lexel as an alternative to silicone. Although 100-percent silicone can create a tight seal, if improperly applied the bead can "zip" off the substrate (see sidebar). Then, you have to use a strong silicone remover or you can't reapply it (or anything else) successfully. In response, the Lexel product offers superior adhesion that creates that 100-percent watertight seal, plus it can be applied over itself. Lexel

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Lexel is an alternative to silicone sealant that is so adhesive it can even be applied to wet surfaces, and it's easy to paint.

is so adhesive it can even be applied to wet surfaces, and it readily accepts paint. This is a high-performance product, so expect to pay more than you would for typical silicone sealants.

APPLICATION TIPS

A tight seal is critical to keep water out from around windows, doors, tubs and sinks. To get the best results from the caulking, you need a clean surface free of dust, dirt, soap residue, oil, old caulk or other foreign materials.

When using caulk in a squeeze tube, knead it with your fingers before applying to get a smooth, consistent bead. When using a caulk gun, keep the nozzle pressed tightly along the joint, and be sure to release the pressure from the plunger after finishing the bead so caulk doesn't continue to dispense and create a mess.

One way to maintain a straight caulk line is to use painter's masking tape. Tape off the areas on both sides of the joint and apply the product of your choice. Shape the joint with a dowel, wet finger or a wet paper towel, working the sealant into the gap. Tool only enough to smooth the caulk. Peel away any excess caulk on the tape to leave a nice, neat bead.

Beyond sealing standard joints and seams, frankly I rely heavily on acrylic caulking when I'm installing interior paint-grade trim to fill any unsightly gaps and cracks (or bad cuts) in the molding. At times, I'm not the most precise finish carpenter, so over

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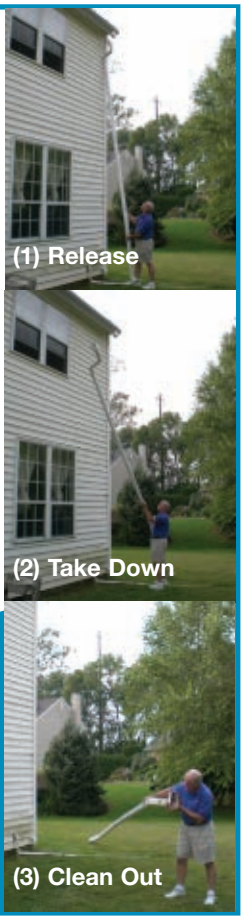

the years I've learned to apply caulk, shape it roughly, let it dry, and sand it down to match a molding profile (or repeat as necessary), to give some shaggy joints a more finished appearance. Granted, caulk isn't necessarily intended to correct the mistakes of shoddy woodwork, but I use it anyway.

Finally, most caulk jobs fail due to improper installation or incorrect product selection. The many different caulk formulations can be confusing, but the products are also labeled with detailed instructions for their intended application. Pay close attention to the package when shopping, and know that while an "all-purpose caulk" might suffice, it may not always be the smartest choice for the job at hand.

NEW CAULKS, SEALANTS AND ADHESIVES

POLYSEAMSEAL EST SPEED SEAL

Henkel Corporation's new Polyseamseal EST Speed Seal is a 100-percent silicone kitchen and bath sealant that is shower-ready only two hours after application. Featuring enhanced silicone technology (EST), the ultra-fast-dry system is ideal when quick use of bathrooms and kitchens is essential, such as in the 53 percent of U.S. homes with 1-1/2 bathrooms or less. Many competitive sealants require a 24- to 36-hour waiting period before water exposure (www.polyseamseal.com).

DAP 3.0 ADVANCED SEALANTS

The new line of DAP 3.0 Advanced Sealants features DAP's Kwik Dry Technology enabling the sealants to be exposed to water in just three hours without washing out. For outdoor applications, this also means not having to wait for ideal weather conditions to undertake a project. The DAP 3.0 lineup includes five distinct options for concrete, gutters, roofs, kitchens and more. Mold and mildew resistant, the 3.0 sealants offer superior paintability and are easier to tool and less stringy than silicone.

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GE SILICONE II

The new GE Silicone II product line is made of 100-percent premium silicone and, like the DAP 3.0 sealants, the Silicone II sealants are water-ready in only three hours. Plus, a paintable formula is ready for paint in just 30 minutes. The permanent flexibility of the silicone keeps it from breaking down so it can protect a home as the seasons change and joints expand and contract. The new GE sealants come with 5-year

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mold-free product protection that helps keep the cured caulk mold- and mildew-free and looking clean for five years, with regular cleaning. At the time of publication, the Silicone II sealant was the first and only caulk to attain the NAHB Research Center National Green Building Certification.

THE SMART PRIME AND REPAIR SYSTEM

The SMART Prime and Repair System from Gardner-Gibson provides a healthier solution for priming, caulking and patching walls with a new zero-VOC, virtually odorless formula. The three products in the system include SMART Elastomeric Caulk & Sealant, SMART Stain-Hide Primer/Sealer and SMART Non-Shrink Wall Fix Spackling. The new family of products helps preserve healthy indoor air quality with no harmful chemicals or noxious odors. In doing so, the SMART products also address

the growing trend of people with asthma, allergies and other breathing conditions at home and in the workplace. “SMART products are perfect to prepare walls while people are still working or living in the spaces,” says Morton Jones, director of research and development for Gardner-Gibson. “It’s almost turned painting into an ‘invisible process’ with no odors.”

ECOGLUE EXTREME ADHESIVE & SEALANT

For the green-minded handyman, EcoGlue Extreme from Eclectic Products is a high-performance polyether with moisture-cure technology that is 100-percent solids, solvent-free and contains less than 2-percent VOC. It’s environmentally friendly without sacrificing strength, providing “instant grab” adhesion on

a wide variety of substrates for a lasting weather-tight seal, even in difficult wet-application conditions. EcoGlue Extreme is suitable for both vertical and overhead applications and can be painted after 24 hours. It contains no odor and is safe to use indoors or in confined spaces. Eclectic Products also offers EcoGlue Premium Wood Adhesive.

GORILLA GLUE IMPACT-TOUGH EPOXY

The makers of Gorilla Glue now offer a new Gorilla Epoxy with high impact resistance and an uncommonly strong bond in a formula that takes only five minutes to set. Many quick-setting epoxies create a brittle bond, requiring jobs to be re-done. The new epoxy formula utilizes urethane hybrid technology to improve overall strength and flexibility for a permanent fix the first time. The low-VOC two-part epoxy comes in a single-plunger, dual-tube applicator to easily extrude equal parts of the product so the user can easily mix them together to begin the curing process. The Gorilla formula bonds steel, wood, aluminum, ceramic and more.

DAP PRO CAULK TOOL KIT

Applying caulks and sealants is typically messy and time consuming. But with the new DAP Pro Caulk caulking tools you can seal like a professional in minutes. The kit contains four tools with a variety of edge sizes and shapes. There's a tool for smoothing larger joints and a tool for smaller joints and grouting tile. Also included is a mini-tool for smoothing joints in hard to reach places, as well as a caulk-removal tool. To use the Pro Caulk system, simply select the tool according to the size of the joint being sealed and the finish desired. Applying even pressure, quickly slide the tool along the joint for a perfect finish. DAP Pro Caulk tools are made from DuraFlex and are easy to clean with water or mild dishwashing detergent.

AMAZING GOOP ANTI-SKID EPOXY WITH GRIT

Amazing Goop is a line of high-performance adhesives for a wide array of uses. Now available is the Amazing Goop Anti-Skid Epoxy with Grit, which comes in an aerosol spray can for easy application to anything that

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needs extra grip. The *EHT* staff tested the product on a ladder, but it's suitable for interior or exterior use on wood, concrete, metal, fiberglass, tile and other surfaces. It dries quickly, offers firm footing even in wet conditions and is even friendly on bare feet.

FAMOCRETE INSTANT CONCRETE REPAIR

Famocrete Instant Concrete Repair is a rigid, sag-resistant polyurethane repair product for broken or spalled concrete. This two-part product comes in a ready-to-use universal cartridge tube, which mixes the product at the point of application. Famocrete is easy to apply, consists of 100-percent solids and cures quickly to form a strong

bond to concrete sidewalks, driveways, curbs, pillars and more. The repairs set quickly, and once cured the product is sandable, grindable and paintable.

BIG STRETCH

As far as workability and stretchability, it's hard to top the Big Stretch caulk from Sashco. It spreads as easily as mayonnaise and is ideal for filling large gaps where acrylic latex would normally shrink and pull away from the joint. In fact, Big Stretch can be used to span gaps as wide as 2 inches (with use of a backer rod) and its superior adhesion and flexibility means it will stay in place, capable of stretching more than twice its original size.

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The Green Glue noiseproofing system is designed to substantially reduce noise transmission between rooms. The system consists of Green Glue Noiseproofing Compound, Clips, Sealant, and Joist Tape. When applied between two sheets of drywall, plywood or other building substrate, Green

Glue Noiseproofing Compound drastically reduces noise transfer from one room to the next by as much as 90 percent, including low frequency sounds that are normally resistant to soundproofing. Green Glue Noiseproofing Sealant plugs up easily overlooked gaps and leaks in walls and ceilings that contribute significantly to noise transfer. Both the Green Glue Compound and Sealant are non-toxic, environmentally responsible and contain no VOCs or hazardous odors (www.greengluecompany.com). **EHT**

PREP STEPS FOR SEALANT SUCCESS

Don't skip the preparation for your caulking job, or you'll likely be revisiting it for a clean-out and reapplication. This "zipping" bead of silicone sealant drooping off a window at the *EHT* office was most likely applied to a dirty surface. This is an example of caulking done the wrong way.

Before you begin your project, remove all dust and debris from the substrate and use a cleaner on smooth surfaces to eliminate any oils or other residues. Make sure the substrate is dry before applying. When tooling the bead, work the product down into the joint. Temperature can also affect the size of the joint. According to the experts at Henkel, it's best to apply caulk between 50 and 90 degrees F.

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When it comes to creating outdoor living areas that really shine, look to Aurora Deck Lighting.
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Installing a Garden Window

Add a bump-out window for better light and ventilation.

by Kathy Ziprik

Just because the temperatures are turning colder, there's no reason to say farewell to your garden—just move it indoors. Adding a bump-out Garden Window to your home allows you to grow herbs and plants throughout the year. Not a gardener? Don't worry, these cozy windows make the perfect napping area for the family cat or a showpiece site for displaying collectibles.

One of the best places to locate a Garden Window is in a kitchen. Oftentimes builders install a hard-to-reach double hung window over a kitchen sink. Because they can be difficult to operate in that location, homeowners don't gain ventilation in the kitchen area. With operating casement sidelites that easily crank open to allow in air, the Garden Window solves that problem.

Simonton Windows offers a Garden Window that's easy to install as a do-it-yourself project and adds value to the home.

MEASURE TWICE—ORDER ONCE

This simple installation project starts by gaining measurements of the rough opening so that you can order the Garden Window. If you're replacing the existing window, take off the window's casing trim. Then measure the top, middle and bottom of the opening from side-to-side and top-to-bottom. Also, measure the opening diagonally to ensure the area is square.

For a Garden Window, deduct 1/2-inch in width and 1/2-inch in height when ordering the unit. This will ensure a properly sized unit to fit your area. Next, measure the finished surfaces from the exterior to the interior wall using a combination square. You want to determine the maximum

jamb depth to make sure the proper unit is ordered.

You'll want to note in your order if the window is for a new construction or a remodeling project. If you are ordering for a new construction option, flashing flanges come standard. If you're installing this unit as a replacement unit, the flashing flanges may be ordered as an option if you believe you'll need them for the project.

When placing the order with Simonton, make certain to specify if you want a white, oak or birch finish on the interior of the unit. You may also order an

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For details, visit **simonton.com/taxcredit/eht** or **call 800.746.6686.**

optional insulated seat board to place at the bottom of the unit, which will help increase the R value of the window for cold climates. Instructions will arrive with the seat board for easy assembly and installation.

INSPECTING THE WINDOW

After placing the window order and receiving the unit, carefully inspect the Garden Window. If you're installing this unit as a replacement window, make sure to do this before removing the existing window. Double-check the dimensions of the unit to make sure they match up accurately with the dimensions ordered for the window.

Make certain you have received 12 screws with screw covers. You should also receive two brackets and a tempered glass shelf for the window. If you ordered the flashing flange, make sure you received the trim piece that will snap in at the top of the exterior of the unit to help prevent water infiltration.

If the checklist for your Garden Window comes up good, then move forwards and remove the existing window right down to the rough opening. Re-measure the opening. Repair any damaged areas in the rough opening caused by rot before fitting the new window in place.

DRY FITTING THE UNIT

From the outside of the home, place a sturdy jack stand directly below the exterior of the rough opening. Make sure the stand is level with the bottom sill of the rough opening so that it can support the unit during installation.

Have two people dry fit the window into the opening, using the jack stand to help steady the unit. While one person remains outside, have another person go inside. Double-check to make sure the operable sidelites are fully operational and can easily open while the unit is dry fitted into the home.

SECURING THE WINDOW

Still working with one person outside and one person inside (and using the jack stand for support), position the window and secure it with screws at the top of both sides of the interior of the Garden Window. Go approximately six inches down from the top of the window for installation of the initial screws.

As the screws are being installed, make sure the unit is flush to the interior. Pre-drilling the screw areas will make the installation go faster. With the initial screws in place, measure to ensure the Garden Window is plumb, level and square.

To check if the unit is plumb, place a level vertically on both the interior and face of the left and right jambs. If the bubble indicator is centered, the unit is plumb.

To check if the unit is level, place a level along the sill. If the

bubble indicator is centered, the unit is level.

To check if the unit is square, measure the window frame diagonally. Measure from the top left corner of the frame to the bottom right corner, and from the top right to bottom left. If the measurements are equal, the window is square.

Once these measurements and verifications have been achieved, predrill all screw holes and shim all locations near the screws around the top and sides of the unit. Finally, install all screws. Three screws should be

installed on each of the four sides of the unit.

INTERIOR INSTALLATION

Once your screws are installed, the outdoor person's job is done. The unit will support itself when the screws are firmly in place. Once again, before putting the screw covers on, check to make sure the unit is plumb, level and square. Next, trim off the shims flush to the wall.

To fill the gap around the unit, add fiberglass insulation, pushing it gently into place with a putty knife. If, once the unit is installed you determine that the gap opening is less than 1/8-inch, you may choose to use sealant instead to fill the smaller air spaces.

Add screw covers to the interior of the unit and gently tap each one into place with a mallet.

EXTERIOR FINISH WORK

Moving to the outside of the home, remove the jack stand. If you have chosen to use the flashing flanges with this window, now is the time to apply a bead of sealant in the accessory track at the top of the unit running the width of the window. Place the accessory trim in the track and flush with the exterior wall. Tap into place with a mallet to create a firm fit that prevents water infiltration.

Add sealant around the remaining sides of the Garden Window. Use a putty knife to make sure all the areas are sealed off with the adhesive. If you are not using a flashing flange, simply use sealant around all four sides of the Garden Window.

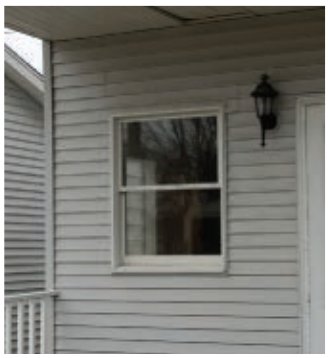
FINAL TRIM WORK

Back inside the home, add the casing trim around the interior of the window. Place the adjustable brackets into the openings and then add in the glass shelf. Note that the screens are removable from the inside for cleaning or clear views. And, the casement handles fold-in for easy access.

If you're using the window for plants, make certain the seat board is protected from potential water spillage from plant containers that could potentially stain or damage the seat board. And, note that the maximum weight capacity on the glass shelf is eight pounds per square foot.

As a final note, make sure to leave the bar code labels in place on the interior of the window unit. The information contained on these labels comes in handy if you ever wish to replace a part. EHT

Editor's Note: *For further information and installation instructions for Garden Windows, visit the Product Section at www.Simonton.com.*



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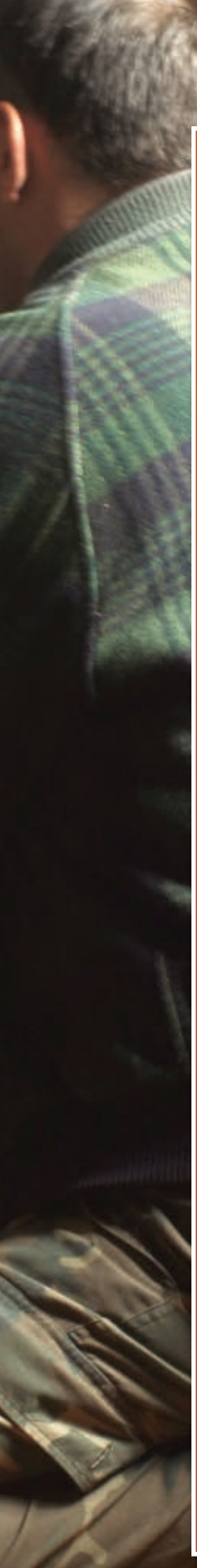

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WOOD BURNING 101

Heating Your Home with this Natural, Renewable Resource

by Monte Burch

With the economy and price of heating fuels today, many folks are heating with wood or are considering wood heat for the first time. Wood heat may be a backup for another heating source, a sole heat source, or used only for emergencies. Regardless, it's important to understand the advantages and disadvantages of heating with wood.

Wood is an environmentally friendly, or "green," heat source as opposed to fossil fuels. Wood is also readily renewable. As trees grow and are harvested, they can be replaced or will usually replace themselves. Wood doesn't contribute to global warming in the same manner as fossil fuels. CO2, the main ingredient in greenhouse gas, absorbed from plants as they fossilized millions of years ago, is oxidized by burning the fuels. Growing trees absorb carbon dioxide, and when the wood is burned releases the carbon dioxide, only to be reabsorbed by growing trees. Another advantage of burning wood is during an emergency when the electricity is off. Wood supplies heat along with cooking and water heating, as well as some illumination. And, firewood is usually more economical to burn than fossil fuels.

There's also the romance of a wood fire. Sitting, gazing at our fireplace in the early morning before daylight, with that first cup of coffee, is my favorite wintertime start of the day.

However, burning wood also has disadvantages. It requires a storage place. And, any way you look at it, burning wood is messy. Wood chips, bark pieces and other litter come in and ashes go out, not to mention the maintenance required of cleaning a fireplace or stove and chimney. Smoke pollution from burning wood can also be a problem, especially in low-lying or urban areas. It's important to check local regulations regarding wood burning. Also check with your homeowner's insurance. A wood-burning fireplace or stove can add to the cost.

WOOD AS FUEL

When wood burns, water evaporates from the wood and a chemical reaction breaks down the wood into charcoal, gas and volatile liquids. Carbon dioxide and water

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WOOD BURNING 101

are released as the main byproducts. As the charcoal burns, it forms carbon dioxide as well as carbon monoxide. Wood, like other heating fuels, is rated by BTU (British Thermal Units, or the amount of heat needed to raise the temperature of one pound of water one degree Fahrenheit). Theoretically, a pound of very dry wood with a moisture content of zero would have a califoric value of 8,600 BTUs. Any moisture in the wood, however, vaporizes as it goes up the chimney, reducing the BTUs

Burning wood safely requires following all safety rules regarding your burning unit, and keeping the fireplace or stove maintained and properly cleaned.

about 1,200 per pound of water released. It is not possible, however, to reduce the moisture content of wood to zero. Twenty percent moisture content is probably as low as you can get firewood. One pound of wood having a moisture content of 20 percent has approximately 0.83 pounds of dry wood and 0.17 pounds of water. This results in a heat potential of approximately 7,000 BTUs. The fuel value of wood depends on the moisture content as well as the density of wood.

THE RIGHT TYPE

Any wood will burn, but the denser or heavier woods provide more BTUs per cord. According to Homelite, one cord of average hardwood, such as white ash, provides the fuel equivalent of 165 gallons of heating oil. Very dense woods, such as oak, can provide as much as 244.55 gallons of heating oil while the softwoods such as Eastern white pine provide the equivalent of

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WOOD BURNING 101

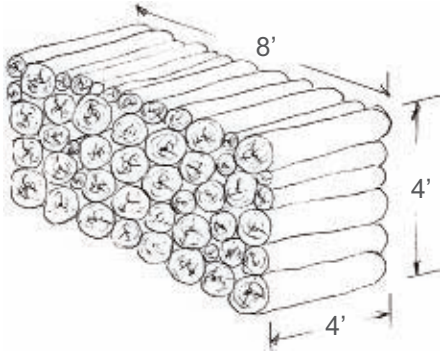
The different species of wood burn differently, determined by the density of the wood, with oak or hickory being some of the densest and most efficiently burned woods.

86.9 gallons. Some of the densest woods are the locusts, hickories, oaks, mulberry and sugar maple trees. Some moderately dense woods are ash, walnut, hackberry, elms and sycamore. The poorest hardwoods include soft maple, cottonwood, willow and box elder. Evergreen species should be avoided due to their resin contents. The resin causes unwanted deposits in flues and chimneys, making them difficult to clean and subject to chimney fires.

Firewood should be cured before burning. Uncured firewood, with high moisture content, burns cooler and creates more creosote, requiring more cleaning and maintenance and is more of a chimney fire hazard. It takes time to dry firewood properly. If purchasing firewood, ask how long since it's been cut and/or cured. If cutting your own firewood, it takes approximately nine months to a year to dry firewood to an average moisture content of 20 percent, depending on the species. Dense hardwoods do best if allowed to season for a full year.

One trick is to cut down the whole green tree during the growing season, allowing the wilting leaves to pump moisture from the woody tissue. Once the trees are dead, they can be cut into firewood in a somewhat drier state. If possible, cut and split firewood early in the year to hasten the drying process. Twelve-inch diameter wood should be at least quartered for faster drying. Cut more than you need for the winter and carry over a supply of dried wood for the following year.

The most common measure of firewood is a cord. A cord is a stack of logs 4-by-4-by-8 feet. Most wood, however, is sold in lengths shorter than 4 feet, called a "face cord," or a 4-by-8-foot stack that is face-cut into the desired length, such as 16 inches. The latter would be one-third of a standard cord. Wood is also sold by the ton, or even "pickup load." One ton of air-



Firewood is commonly sold by the cord, which is a stack of logs 4x4x8 feet, or a face cord, a stack 4x8 feet, but the length of the firewood is usually 16 inches.

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dried dense hardwoods, such as hickory or oak, equals approximately half a cord. When buying wood by the ton, look for the driest wood to prevent paying extra for water. Firewood bundles, sold at convenience stores, supermarkets and other retailers, are also popular. Properly seasoned oak or other hardwoods weigh about 3,600 pounds per cord. A bundle weighing 36 pounds is about 1/100 of a cord. Or, a bundle 1-by-1-by-2 feet is 2 cubic feet, or approximately 1/64 of a cord.

DIY APPROACH

The most economical tactic is to cut, split and season your own firewood. Gathering firewood, splitting, stacking and seasoning can be a very enjoyable and healthful pastime for the entire family. “Warms you twice,” my Uncle Mike used to say.

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WOOD BURNING 101

Make sure you follow all safety instructions and rules regarding chainsaw use and keep family members away from all cutting chores. Wood for firewood is available from many sources. In properly managed timberlands or woodlots, firewood comes from diseased, poorly formed or overcrowded trees, or species inferior for use as building materials. These trees must be "weeded out" much like weeding a garden. If you have your own woodlot or access to a private woodlot, contact your State Forestry Office for assistance in identifying trees that should be removed. Ask permission before cutting or removing trees from property other than your own. Storm-damaged trees are a great source of firewood often available simply for doing the cleanup. National Forests and other public lands sometimes have free firewood in order to manage the timberlands. Landfills are another source. Sawmills often sell slabs and trims for a nominal price.

Firewood burns most efficiently when split. Twelve inch and larger diameter trees should be quartered. Splitting is good exercise. A good splitting maul and/or splitting wedge makes the chore easier. Make sure you wear safety glasses and gloves.

Wood can be burned in fireplaces, fireplace inserts and in wood stoves. Fireplaces are the least efficient with an efficiency ranging from 10 to 20 percent. Fireplace inserts with circulating fans increase efficiency. Wood stoves are more efficient and are available in three basic types; combustion, radiant heaters and circulating stoves. Combustion stoves with the look and feel of an open fired "Franklin Type" are in the 50- to 60-percent range. Circulating stoves are the most efficient. Hearth stoves are

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another type of circulating stove, and both are in the 60 to 70 percent efficiency range. Follow all safety rules regarding your burning unit and keep it well maintained and routinely cleaned.

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Maul or wedge

Splitting logs is easier if you follow the natural "split" of the end grain.

HAWKEN ENERGY OUTDOOR FURNACES

Times are tough, and fuel price projections show significant increases over the coming years, especially for heating your home. There are many ways to cut heating costs. Replacing windows or increasing insulation may yield savings as high as 25 percent on heating bills. However, switching to wood as a fuel source and using an energy-efficient furnace can save on heating bills as much as 74 percent. If you cut your own wood, the savings will be even higher. According to Hawken Energy, many customers see a total return on investment in 3 to 5 years.

Hawken furnaces are designed to operate automatically and efficiently, to deliver exceptional comfort and to last a very long time. A Hawken Energy outdoor furnace can deliver all the home heat, unlimited hot water, heat to multiple buildings, and heat to swimming pools. "And with zero-down financing, customers may pay only $139 per month so savings can begin immediately," says Warren Walborn, president at Hawken Energy. Made in America, Hawken Energy outdoor furnaces are designed with the highest quality standards and upheld by an industry-leading 20-year warranty. For more information, visit www.HawkenEnergy.com.

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HOT TOPICS IN ALTERNATIVE HEATING

Advanced energy-efficient technology and alternative fuels provide clean, cost-saving solutions to home heating.

Chapped lips and numb fingertips are right around the corner as winter draws near, and soon it will be time to heat the house. Most people heat their home by oil or natural gas, which have an unfortunate tendency to rise in price. Heating the home with alternative methods not only conserves energy and money, but it also benefits the environment by reducing fossil fuel dependency. From stoves that burn alternative fuels to solar power and geothermal technology, homeowners have many options to warm the household.

If you aren't afraid of the extra labor of cutting wood, stacking logs and loading the stove, wood makes an excellent fuel—just ask a California firefighter. Wood is an easily renewable resource that evokes a classic, rustic atmosphere when burned as fuel in a stove or fireplace. As an added benefit, if the electrical power blacks out, you still have an operable heat source. Using wood can support the local economy and lower your heating bills.

Plus, the latest fireplaces and stoves have evolved beyond the messy, inefficient clunkers of

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yesteryear. The latest models burn more cleanly and efficiently without the dangerous creosote buildup. Most of what goes up the chimney is just carbon dioxide and water vapor. There is very little smoke or odor. The new units are more attractive, with styles to fit just about every décor, including accents, stone inlays, tiled borders and more. Plus, they're easier to operate.

As the "green" movement gains more and more steam, stoves that burn dried wheat, corn, or pellets made from dehydrated wood chips, are spiking in popularity. The new multi-fuel stoves allow you to burn all three environmentally friendly fuels in the same stove. When used to heat your home, multi-fuel stoves can cut your energy bill as much as 70 percent. These alternative fuels are good for the environment because they are made of endlessly renewable materials that do not rely on fossil fuels. Corn, wheat and pellets also require much less storage space than wood, and heat output of the stove can easily be controlled by the user.

Another alternative heating option is geothermal power extracted from heat stored in the earth. This geothermal energy originates from natural phenomena such as radioactive decay of minerals and from solar energy absorbed at the earth's surface. Geothermal power is cost effective, reliable and environmentally friendly by reducing fossil fuel emissions. In principle, a geothermal heat pump functions like a conventional heat pump, by using high-pressure refrigerant to capture and move heat between the indoors and out. However, geothermal systems transfer heat through long loops of liquid-filled pipe buried in the ground. Because the earth's temperature stays right around 50 degrees, no matter what the weather is, geothermal systems can easily and efficiently extract and disburse heat through the 50-degree liquid circulating in its ground loop. This provides a much more stable source of heat than conventional heat pumps, which rely on the outside air as a heat source.

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COMPETITORS MODELS		SUNHEAT
CLAIMS	**REALITIES**	**FACTS**
CABINET		
Plastic & attractive wood cabinet	Most major competitors cabinets are plastic or have plastic fronts where the heat exhausts	All Wood Cabinet - including remote and fireplace models
WARRANTY		
Three Year Warranty	Read the warranty. Most parts are limited to one year by some competitors	Three year bumper to bumper backed by a fifty-five year old Nebraska Company
HEAT		
More heat	Some have no copper at all. Others only 5.9 to 12 oz. therefore they cannot produce as much heat or hold it as long as the SUNHEAT which makes competitor's models less efficient	24 oz. copper acting as a heat sink produces more heat than any other 1500 watt infrared heater
FAN		
Fan twice as quiet as competitor	None twice as quiet - one is 8 decibels quieter, most have a life expectancy of only 20,000 hours	Quiet fan with sealed ball bearings with an incredible 80,000 hour life expectancy
HEAT TUBES		
20,000 hours	Wiring is very thin with life expectancy approx. 5000 hours. Some heaters have only been on the market one year or less.	6000 plus hours with heavy duty wiring and a three year guarantee easily replaceable by owner
QUALITY		
Good Quality	Electronics located close to heat exhaust with light wiring. Contracted out on a low bid basis to factories that do not specialize in building infrared heaters. For most, this is their first season of building infrared heaters and they are not quality controlled inspected in the U.S.	No electronics close to heat exhaust. All high quality heavy duty components and parts. Designed, engineered and guaranteed by a fifty-five year old Nebraska Company. Built in our own factory under watchful eyes and every heater is inspected in the U.S. by trained quality control inspectors

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with a heat-transfer fluid flowing through it to transport the collected heat to somewhere useful, such as a hot water tank or household radiators. The solar panel is located in an area prone to ample light exposure throughout the day—usually on the roof, and a pump circulates the heat-transfer liquid throughout the system.

Another approach to more energy-efficient heating is the use of "smarter" hybrid HVAC systems that utilize two fuel sources for efficient heating and cooling, usually a gas furnace and an electric heat pump. These systems aren't "alternatives" so much as they present a more efficient means of using conventional power sources. The hybrid HVAC control system is calibrated by your local installer according to seasonal temperatures to switch between the furnace and heat pump, depending on which is the most economical power source for your heating or cooling at any given time.

Also, don't overlook space heating as a simple but effective tactic to reduce energy bills. The average annual cost to heat an average 1,500 square-foot house at 70 degrees is roughly $1,800. With such high costs, it makes good sense to heat only the rooms in which you spend the most time, rather than heating the whole house. Although it does rely on traditional electrical power, targeted heating with space heaters can be a clean, easy and unobtrusive method of reducing overall energy usage.

The following is a roundup of a few interesting new systems on the market to conserve energy and mitigate your heating bill.

INGRAM'S GEOTHERMAL SYSTEM

Ingram's Water and Air Equipment is a geothermal system that is commonly set up with a "well water supply system," in which heat can be taken from the ground during winter and transferred through a heat pump to the air in your home. Heat can also be transferred back into the ground during summer to cool your home. Since heat from the ground is free, the only electricity needed is for moving that heat between your home and the ground. A geothermal system can lower your heating bills up to 50

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- Improves room comfort at an affordable price
- Easy to install—no tools necessary

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percent and cooling bills up to 30 percent. Plus, due to the recent passage of the economic stimulus package, homeowners who install a geothermal system can receive a 30-percent tax credit for qualified installs with no maximum cap.

The Ingram's package was designed with the DIY'er in mind. The kit includes the heat pump, thermostat and everything needed to install a geothermal open-loop system, as long as you have an available water source. (In an open loop system ground water is usually supplied to the heat pump by a drilled well with a submersible pump system.) The only thing you have to do is pipe in the water from a well, a pond or a lake to the heat pump, as well as to install a line to the dump area, such as a creek or river downstream from the source. After the water has been piped to the unit, you will install a slow-closing solenoid valve on the return side of the unit. The power for the solenoid valve comes from the included 220V/24V transformer, which is wired into the contactor set of the unit. The only thing left is to tie in the pipe going to the dump area. That pipe will connect directly to the outlet of the solenoid valve.

There are two basic types of geothermal applications. A forced-air application is usually going to tie into your existing ductwork. The second type, a water-to-water application, would connect to some type of radiant floor-piping system, which is usually installed during new construction. To learn more or buy direct, visit www.ingramswaterandair.com.

YUKON MULTI-FUEL FURNACE

A Yukon multi-fuel warm air furnace can heat your entire home to your desired temperature, not just one or two rooms, whether you are burning gas, oil, electric or wood/coal. And, regardless of which fuel you are using, The

Yukon furnace operates at UL-listed high efficiency. If you have your own wood supply, the cost of heating your home becomes almost nothing. And, if you leave for a day, week or more, there's no problem. The furnace switches from wood to whatever your backup fuel is, all automatically. Plus, you never have to start a wood fire because the burner does it for you. Air conditioning, a humidifier, or an electronic or filtered air cleaner is easy to add. Learn more at www.yukon-eagle.com or call 1-800-358-0060.

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LENNOX SUNSOURCE

The new Lennox SunSource is the first integrated solar-assisted residential heating and cooling system. Featuring innovative, patent-pending technology developed specifically for use in residential applications, Lennox SunSource uses solar energy to help power a heat pump that both cools and heats a home. The new, environmentally friendly technology will help homeowners reduce electricity consumption and lower utility bills, while also maintaining overall comfort. In addition, because of its use of solar energy, Lennox SunSource will contribute to reducing the strain on the country's electricity grid during peak electricity usage periods. "As photovoltaic panels become more affordable, solar power becomes a more viable solution for reducing peak residential energy consumption, lowering energy bills and reducing your overall carbon footprint," said Bill Cunningham, the SunSource product manager at Lennox Industries. "It also represents an affordable way for homeowners to give solar

energy a test drive without having to invest in solar panels for the entire house."

The Lennox SunSource integrates solar power with a traditional heat pump—an all-in-one heating and cooling system. The unit draws energy from a single 190-watt solar panel measuring approximately 3 feet by 5 feet, providing power to assist the fan motor that moves air across the outdoor coil, a critical component in any home comfort system. The solar panel, which should face southwest for maximum exposure to the sun, can be mounted on the home's roof, on a fence, or on a pole in a convenient location. Even on days with limited sun exposure, Lennox SunSource takes advantage of the available solar resources and reduces energy usage. According to Cunningham, Lennox also is evaluating the integration of Lennox SunSource technology with traditional air conditioning units. For more information, visit www.lennox.com or call 1-800-9-LENNOX.

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60	205

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60	205
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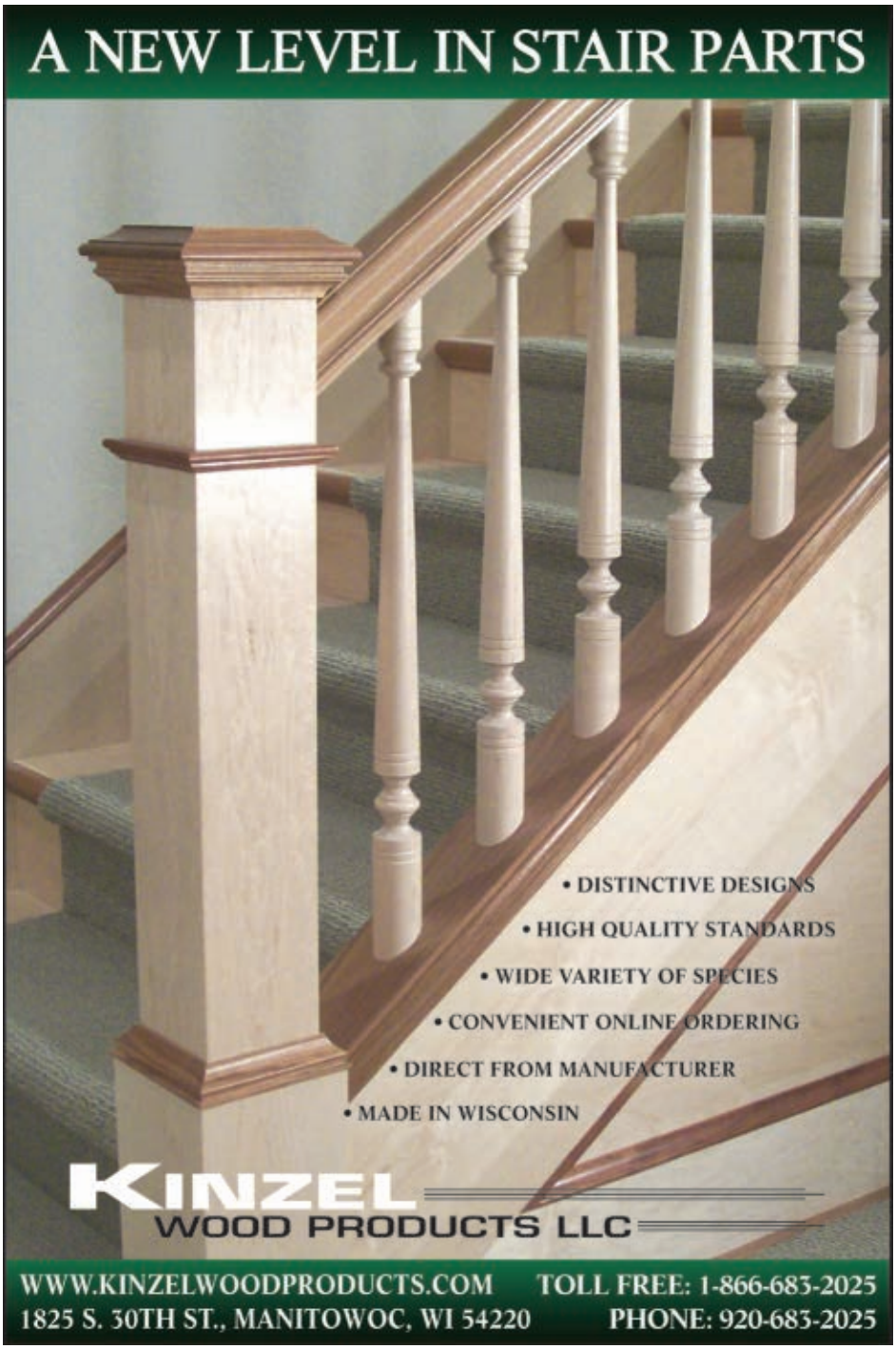
a sealed copper chamber filled with a harmless silicone liquid that will never spill, leak, boil or freeze. Running through the liquid is a proportional watt hydroelectric element that is only being supplied a proportional amount of power on an as-needed basis. When Hydro-Sil is turned on, the silicone liquid is quickly heated, and with its exceptional heat-retention qualities, continues to heat after the Hydro element shuts off. For more information, visit www.hydrosil.com.

ECO-HEATERS

ECO-heaters offer out-of-the-way wall mounting for an economic way of providing efficient room heating. Using convection technology, heat is mainly generated behind the heater in the space between the panel and the wall, which leads to an efficient up-draft of heat circulated into the room. This principle of convection means that about 90 percent of the heat comes from the back of the panel, while only 10 percent is radiated from the front of the panel. This form of "background" heating is not only very economic, but also safe and efficient. ECO-heaters are designed as an alternative to conventional space heaters and other systems that use large amounts of electricity. It operates using the same electricity as four 100-watt light bulbs, while heating an entire room.



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ECO-heaters save on floor space, they're safe to use around children and pets, and can be painted to match any décor with water-based Latex paint. ECO-heaters are also designed to be left on for long periods of time, giving you comfortable background heat at a low cost. This is similar in concept to a central heating system, yet far less expensive. ECO-heaters are UL-listed, International Safety Standards-approved and come with a 2-year warranty. Learn more at www.eco-heater.com.

THE ORIGINAL SUNHEAT

The SunHeat infrared zone heating systems are rated to heat 1,000 square feet with no wasted heat near the ceiling. The unique zone process helps prevent the wasteful air layering that occurs with conventional heating systems, and operates for an average of less than a dollar a day. The SunHeat 1500 model requires 3.4-kilowatt hours to heat one degree per day, compared to a conventional electric forced-air furnace system that requires 5.49-kilowatt hours to heat one degree a day. The powerful, compact heater features high efficiency quartz infrared heating elements within solid copper heat exchangers. The unit has an adjustable thermostat to regulate a room's comfort level, and it operates very quietly.

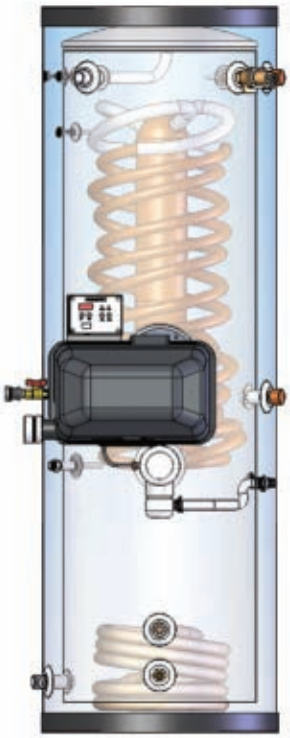
The SunHeat system requires no professional installation and can be plugged into any 110-volt outlet. The heater's all wood cabinet stays cool to the touch and can be operated without the worry of starting a fire. With the "set it and forget it" thermostat, the unit can run continuously, even while you sleep. Mounted on four casters, the indivually controlled units roll to wherever more warmth is needed to plug into any room. Besides lower operating costs, the system is virtually maintenance-free. The SunHeat has a lifetime washable filter, so there's no need to purchase high-priced replacements. There are absolutely no burners to adjust or replace. Long-life industrial infrared commercial quartz tubing can be replaced easily and inexpensively.

The SunHeat is also designed to maintain desirable humidity levels. No humidity is removed from the air, and water vapor will not collect on windows as readily as with conventional systems. Since SunHeat's unique concept mixes air at ground level, floors stay warmer. This means the temperature from floor-to-ceiling and wall-to-wall will never vary more than 2 degrees F. SunHeat also comes with a full 3-year warranty, including new commercial quartz tubes. In addition to the SH-1500 model, T&R Distributing offers the SunHeat 750 model, as well as a fireplace model. For more information, call 1-800-491-4690 or visit www.SunHeat.com.

PHOENIX SOLAR WATER HEATER

The new Phoenix Solar Water Heater from Heat Transfer combines domestic hot-water storage with a 97-percent efficient, gas-fired backup—all in one unit—to meet the hot-water demands of residential and commercial solar thermal systems. In fact, one of the Phoenix units was recently installed in a home owned by U.S. Green Building Council founder David Gottfried. At the time of publication, the 1,500-square-foot, "deep-green" project was the highest-scoring residential project since the LEED for Homes Green Building Rating System was unveiled in early 2008. ("LEED" stands for Leadership in Energy and Environmental Design.)

The Phoenix Solar unit, Model PH130-80S, is an integral part



of the solar- and gas-powered space-heating and domestic hot water (DHW) systems in the home, a 1915 Craftsman-style bungalow located in the Rockridge district of Oakland, California. The Phoenix functions as a storage tank for the solar thermal and hydronic heating systems, while also providing high-efficiency gas-fired backup when solar power is not enough to heat the domestic water or the home.

Here is how the system works: Perched atop the home's roof, three 4-by-8-foot flat-plate solar collectors from Solar Thermal Systems collect heat energy from the sun whenever it is available. When solar is available, hot fluid from the solar collectors circulates to the Phoenix in the garage, where the heat is transferred to water stored in the water heater's 80-gallon tank. This water is used for potable hot water applications; i.e., showers, clothes washing, cooking, etc.

In addition, an external heat exchanger maintains a second, closed hot-water loop that sends hot water from the Phoenix storage tank to a series of wall-mounted, high-surface-area Myson radiators, located throughout the Gottfried home.

On overcast days or at night, the modulating gas burner inside the Phoenix will fire, providing between 44,000 and 130,000 BTU per hour of backup water heating for the hot-water and space-heating applications.

"I preferred wall-hung radiators, rather than a conventional, forced-air heating system," says Gottfried, after experiencing his first winter in the newly renovated residence. "The new system is much quieter and improves our air quality by not blowing pollutants throughout the house.

"Each room in the house is a separate zone—eight in all—allowing me to modulate the heating according to the need," Gottfried continues. "In other words, we heat only the bedrooms at night and only the main living areas during the day when we are home," helping to lower consumption and save energy. For more information, visit www.htproducts.com. **EHT**

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EXTREME METAL ROOFING

By Laurie Mercer

Lucky Kavalaukus, age 89, is sitting on the front deck of his Highland Lake cottage telling me that our cottage on Carr Island in New Hampshire, which he looks at every day, does not have a new metal roof on it. I have to show him pictures to prove that it does.

The classy two-tone patina top on our cottage, which arrived on a retired party boat with the roofer, does not fit many people's expectations about what a metal roof is. Things have changed.

I had just been up on the roof taking photographs to illustrate this article about metal roofs for *Extreme How-To*. Roofers do have a different perspective on things. From my perch I scanned the sky for the eagles that the builders had seen, and watched the loons bobbing in the boat channel.

Our Carr Island camp was built as a hunting and fishing lodge around 1860, and very little had changed except that a series of leaky asphalt roofs had begun a kind of morphing process that over time demanded selective tear-downs and rebuilds and some pretty funny comments in the guest log. The area around the chimney and over the main bedroom especially was susceptible to wet nights. We repeatedly lugged contractor bags stuffed with nasty, sharp-edged shingles to the town dump.

Just finding roofers to come over by boat to repair the island cottage roof was so problematic that one year I drove my own roofers from upstate New York to New Hampshire to take care of it. For two days I cooked inside the cabin while the man and his son scrambled around a very steep pitched roof. Talk about a stimulus package. This team spent much of their earnings on New Hampshire's legal fireworks.

Lots of folks like metal roofs because often they can be installed over an existing roof, which eliminates the need to add wasted asphalt

shingles to the country's landfills. In New Hampshire, however, you can only cover one layer of pre-existing roof. You definitely need to look into the building code before you begin.

While I came to understand what good stewardship of land and materials meant later in life, I have no idea where those shingles went, but I have to assume they are percolating in some sanitary landfill. And yes, I do feel bad about all of those layers of leaking roofs. But my sister Bonnie lives in green-friendly California so she feels even worse.

One of our trusty resources for this new project was *Green Remodeling (Changing the World One Room at a Time)*, a book by David Johnson and Kim Master. Johnson and Master wrote that the type of roofing we use has serious consequences on our health and the environment: "Sloped roofing materials, such as asphalt-based rolled roofing and shingles, will offgas toxins when heated by the sun. Flat roofing materials, such as tar and gravel, will also continually offgas when heated by the sun, emitting known carcinogens such as VOCs from asphalt, including benzene, polynuclear aromatics, toluene and xylene."

Modern metal roofs are made to look like slate in this instance. Profiles come in different thicknesses and lots of different colors.

New roof, new porch pitch. The older part of the Carr Island camp-to-cottage remodeling project features a two-tone patina roof on the existing pitch and a standing-seam treatment on the new, flatter surfaces of the porch.

The authors say that 78 percent of the total roofing dollars spent in the U.S. is spent on re-roofing, potentially exposing homeowners to high levels of toxic fumes every time a roof is replaced or repaired.

Those and other ambitions for our renovation of the old hunting cabin helped us choose a "greener" metal roof made largely from recycled materials. As one expert said, your roof should last as long as your mortgage, and the product we chose had a 40-year transferable warranty (from the point of installation). Metal is also the preferred material in rainwater catchment systems—a growing area of interest in regions in the U.S. where water conservation is a serious issue. For example, in some instances, homeowners are not allowed to use water from their roofs, even to water their gardens.

DIY AND THE INTERNET

There are a lot of ways to approach a DIY project—really do it yourself hands-on, or pay somebody else to do it according to whatever research you've done. In both instances, hitting the hammer or the keyboard, things get done to a higher level of expectation.

For us, DIY meant carefully sleuthing the Internet and not just taking a manufacturer's claims at face value. Many parts of our project sprang from the Internet, ranging from selecting handmade drawer pulls for the kitchen to looking at local architects' portfolios (we chose Charles Michal of Weller & Michal in Keene).

Michal had spec'd our designs for a roof of asphalt shingle, so he wasn't thrilled when we told him our research had led us to metal roofing as today's green solution to roofs. It's hard to say what our builder, Peter LaRoche of Peterborough, thought about

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metal roofs. LaRoche's eyeball rolling was something we looked for in any case. The words "metal roof" had his eyeballs rocketing.

My sister Bonnie is a born cyber sleuth and an exemplary consumer—the kind that keeps all the receipts and quickly replies with warranty cards, sometimes the next day. She says one misconception about shopping the Internet is that cyber space is not necessarily cheaper. For example, while doing extensive research for lighting designs for the entire cottage, she found the exact same products at a better price "offline" at a trendy interiors store in her own Los Angeles beach neighborhood.

Go figure.

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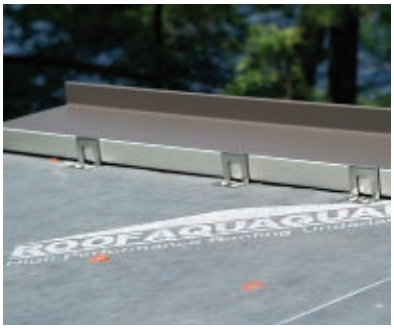
DIY OR HIRE SOMEBODY ELSE TO DO IT

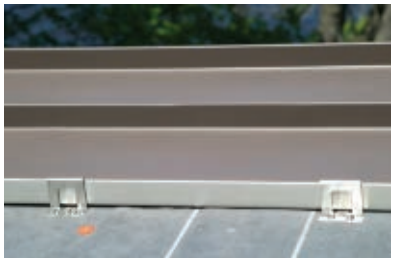
Our quest to end leaking roofs forever led to the metal roof manufacturer Classic Metal Roofing Systems of Piqua, Ohio. We liked that they were a second-generation, family-owned business, used 98-percent recycled materials, and their products are all made in America. To top it off they had their own dealer network trained in Ohio for professional installation. Plus they made good-looking roofs in colors, profiles and thicknesses to match the "feel" of our project. Just one call to Classic got us a huge customer sample folder with actual size materials.

Carr Island gets heavy snow, so that was another consideration for our roof. If improperly installed, metal roofing can heat up and suddenly let go with a

A series of interlocking clips makes installing aluminum panels fairly easy because they're lightweight and fit together well.



Roof Aqua Guard is one of several products favored by professional roofers.



This is the way standing-seam panels are installed. The pitch of a roof determines the best product to use—shingles or standing seam.

sheet of ice crashing onto unsuspecting people or property below. We also had an extremely hot upstairs bedroom area, and metal reflects more heat than asphalt.

Given these considerations, we hired Gerry Donaghue of Donaghue Construction, to drive the project. "You've got to understand how to manage the snow coming off a roof," Donaghue says. "Installing metal roofs is not rocket science, but it must be installed correctly to make it work. If it's a hand's-on DIY person, I strongly recommend hiring a professional to prep you for the job."

Getting good advice is a wise investment. Donaghue says the average price for the projects his company does is in the $18,000 to $22,000 range, but he has a big home this summer that will cost $50,000 to roof. Metal roofs clearly cost more than asphalt shingle. Donaghue estimates that as of late summer 2009, the cost for materials is about $6 to $12 a square foot whether it is steel or aluminum, standing seam or profiled shingles.

Most metal roofs are Energy Star efficient and qualify for up to $1,500 in federal tax credit.

We installed slate-like shingles on the pitched roof and standing seam on the new porch additions, where the pitch was too shallow for a profiled surface. Standing seam (long verticals) is what you commonly see on American metal roofs where the metal roof market accounts for just 8 percent of the total roofing market. That may seem small, but it's about double the percentage of just 20 years ago.

METAL ROOFS, THEN AND NOW

When they think of metal roofs, most people think of franchise restaurants with their brightly colored, come-hither-looking tops. Or, they think of agricultural metal roofs with screws rusting right through the metal into the building.

Today's modern metal roof always has some kind of clip locking system with interlocking panels, so it can float with the heat, leaving the panel to contract and expand depending on the temperature. The clip system allows the roof to do that. The clips also keep the roof flat to the decking material so that when air

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The standing seam on the flat, new porch surfaces goes down quickly. The roofers *also* have a fine view of Highland Lake.

comes across the roof, it can't lift the roof, which is why you see more metal roofs in coastal areas. Classic Metal Roofing even has testimonials from people whose roofs survived Hurricane Katrina.

Donaghue says, "All of the better products on the market have a slotted system or a clip system. Standing seam goes down with a screw-down, stainless steel clip. On the shingle products, those are aluminum clips. You can use aluminum or steel. On a lake you can use steel, and it won't affect the warranty, but if you are near the ocean you have to be a certain distance from salt air to use steel."

WIND AND WEATHER

No surprise here—some seasons are better than others to re-do any roof, including metal, which is slippery when wet. Donaghue suggests that, barring a weather-related catastrophe, you, "Pick a season that's right for you." Frost, he says, can sometimes take hours to leave. Summers can be too hot. He always wears fingerless gloves year around because of the ever-present sharp edges. His best season in the Granite State is fall.

The upside? Roofing, or re-roofing, often is a job you can schedule to fit your time frame.

OTHER TIPS FROM A PRO

"If you are doing the work yourself, the easiest thing to do is to use aluminum products because they are lightweight and easy to work with. Steel is much more difficult—harder to bend, heavier, more difficult to form and less forgiving," says Donaghue.

"Next, I would definitely recommend aluminum in a shingle rather than standing seam. Shingle is easier to put on (panels come in small sections). Once you have the basics on how it goes together, it's easy and they are lightweight."

The real problem he says for DIY'ers is staging, including having the right brackets. But before we get to brackets, he advocates photographing every

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job before you begin and really studying the roof as it exists. Things to look for are problem areas like rot, dips, swales, missing shingles, or anything else out of the ordinary. Often DIY'ers do roofs for others, and most homeowners are unwilling to climb out onto a roof to inspect areas of concern.

Determine the existing material: asphalt, fiberglass, wood shake, wood shingle, slate, asbestos, clay, concrete or something else. Roof styles themselves can be gable, hip, intersecting, mansard, gambrel, saltbox or Dutch hip, among others. In order to get a handle on your plan of action, Donaghue

Aqua Guard is held in place by these round, orange tabs.

strongly recommends that you draw your roof. If you don't have plans for your home, use a clean sheet of grid paper. Imagine what your roof looks like from the top looking down—use the point of view of an eagle, not a worm.

Having a good understanding of the structure, including overhangs, will help your organizational skills. Then there is the ability to get onto the roof and having the right tools at hand. For staging, "You can use the wooden staging brackets that you normally use on an asphalt roof. Tool supplies and lumber yards have them."

As for safety he quips, "Don't

Enough clips, nails, and other attachments should be up on the roof with you to ensure productivity and time well spent.

do it at all." What makes roofing different from other home building projects, he explains, is that if you fall you are going to come down off the edge to the earth below, in a heap. "You have to be very comfortable up there on a roof. I've had airline pilots come up, and they couldn't take it,"

"They weren't comfortable," he adds. "You have to be really careful. And a helper has to be balanced and able to climb around. Most of the guys we hire are younger—mid-twenties. They are lightweight, agile and intelligent. No goofballs up there."

Donaghue says installing asphalt takes less thought; you just lay the material down and nail it. "Metal roofers don't have to be finish carpenters, but they do have to be more of a craftsman. Guys who do all types of siding are usually pretty good at it. You need a person who can think through a process of interlocking panels, forming them, using the snips, bending; there is a lot of hand work required."

Chimneys, especially rough natural stone, skylights, vents, satellites, antennas and lightning rods present more challenges to forming and fitting details. "The average skylight," he says, "will add 2 to 4 hours of labor. Skylights are complicated

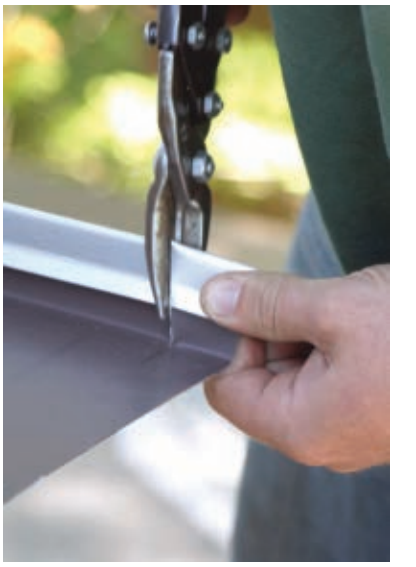
because you have to take apart the flashing system. On chimneys you often have to take the lead off first. It's always something different."

Most modern metal roofs have some kind of foam panel that adds insulation value in a roof and cuts down on noise. Another roofing material of prime importance is roofing paper. Donaghue uses Aqua Guard, which he gets from Classic Metal Roofing. "All metal roofing requires a minimum of 30-pound felt between the roof deck and the panel," he says. "The decking could be plywood or a layer of existing shingles."

While called "felt," today's roofer is probably using a kind of fiberglass matt. Most are synthetic products with names like Aqua Guard, Roof Top Guard, and Titanium Shark Skid. Costs range from 10 to 11 cents a square foot for paper, and 12 to 20 cents for the felt.

Being trapped on jobs by New England's bad weather has made Donaghue a true believer in the

Roofers form a standing seam panel for installation. There is a lot more hand work involved in installing metal over asphalt shingle.



Snipping is part of forming every panel and the cause of most cuts during the job. Donaghue says that if you are in a hurry, there will be "more blood."

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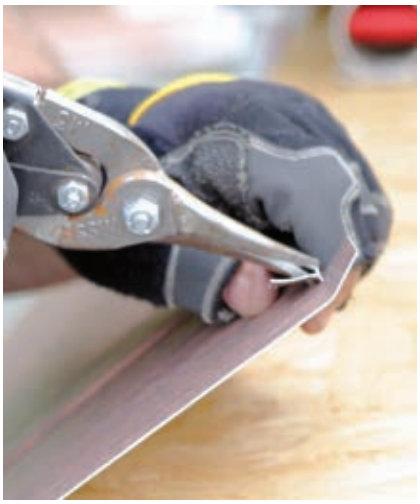
value of using synthetic products according to the manufacturer's directions. "It does a couple of things," he says. "It allows you to strip the old roof, put the paper down, and if you don't get the roof on that day, you are OK with an open roof. It's not going to leak."

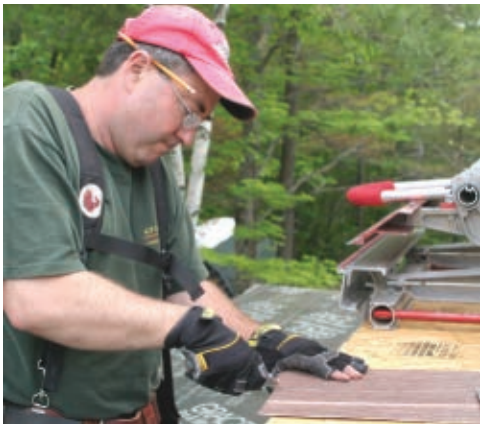
Leaks are a roofer's worst nightmare, but also their reason for being, especially where mold and mildew cause problems.

For my sister and me, the classy new two-tone patina metal roof on our rustic new/old cottage means no more leaks. And no more jokes in the guest log book about them either. **EHT**

Editor's Note: *Laurie Mercer is a freelance writer from Honeoye Falls, New York. Along with her sister Bonnie, she is restoring and remodeling Carr Island, a family property on Highland Lake in Stoddard, NH. To see a video, search for "Carr Island" on YouTube. Mercer's website is www.lauriemercerpr.com.*



After you've done a few roofs, bending operations like this one are almost mechanical and routine, but every roof presents different challenges. Obstacles to be trimmed around include chimney, satellites, skylights, antennas and lightning rods.



Gerry Donaghue of Donaghue Construction says about half of his business now comes from installing Classic Metal Roofing Systems roofs. One advantage to the business is that customers "already know what they want."

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GETTING UP THE COURAGE TO DO YOUR OWN DRYWALL REPAIRS.

DAMAGE UNDONE

by Larry Walton

For years I had one of my drywall buddies take care of most of my drywall repairs, and for years he would say, "you know this isn't that hard."

Finally I heeded one of my favorite jobsite sayings, which is "don't be scared." I mean, what's the worst thing that can happen when doing drywall repairs? The drywall doesn't have to fit perfectly, and all the joints and fasteners get covered with a plaster-like coating. To top that off, several types of texture are available to camouflage the job.

Now, this is not to downplay the importance of professional drywall installers. When it comes to hanging, taping and texturing big jobs, they can get it done right in a fraction of the time it would take us. But when it comes to repairs, we can do this stuff.

When you watch professional drywallers do touchup and repairs you can tell they aren't afraid to spread a little mud around. On the jobsite it's not uncommon to see one of the guys on the drywall crew walking through a nearly finished house with a taping knife and a tray full of joint compound, fixing minor dings and scratches on the walls. They spread the mud around because they can match the texture. When the repair is painted the finish will blend together.

There are, of course, lots of reasons for drywall repair, such as water damage, construction dings, cars driven a bit too deep into the garage. When we are remodeling, we create a lot of these repairs on purpose. Sometimes we need to open the walls to run wire and pipe, or we change the size and location of window and door openings. We straighten crooked studs and install handrail backing. All of these projects require some drywall repair.

When it comes to making any kind of repair, it's best to know the basics of how a product was installed in the first place. Most of our modern

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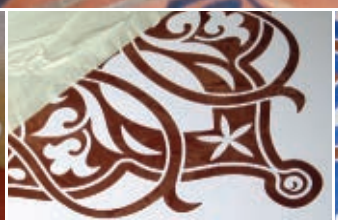

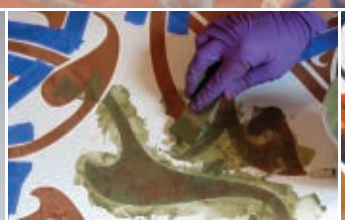

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houses have interior walls made of gypsum board over studs. The studs are usually spaced at 16 inches on center, and the most common size for the drywall panels is 12-by-4 feet. The long edges of the panels are thinner than the field, which allows room to build up joints flush with the wall plane.

The joints are finished with a combination of tape and joint compound, which is sanded smooth after drying. The surface is then textured and painted.

To some degree all drywall repairs will repeat parts of this process. Even if you are just spackling a few nail holes from a previous wall hanging, you need to pay attention to how it affects the texture. If you use too much spackle and smooth out the surrounding area, the repair will be noticeable.

TIPS AND TRICKS

You've probably seen attempts to repair the hole made from a door handle. Spackles and joint compounds sag in a hole this big, so reinforcement is necessary. If the webbing or tape used adds too much to the thickness of the area, the results can be less than desirable.

Often the best solution for this type of drywall repair is to replace the damaged board with a new piece of drywall. Gypsum board itself is relatively inexpensive, and I usually keep a few scraps around to make repairs. In most residential applications, the ceiling boards are 5/8-inch thick, and the wall boards are 1/2-inch thick. Specialty panels are available for areas such as utility rooms and bathrooms where water or high humidity may be an issue.

A drywall T-square makes cutting drywall a quick job. I hold the square at the top and press my foot against the bottom, using it as a guide to cut the paper face with my utility knife.

After cutting one face, snap the board back.

For smaller repairs I cut the patch piece first, place it over the damaged area and trace around it.

To secure the gypsum-board patch in an area between studs, insert a small piece of wood behind the existing wall boards in a way that bridges the backside of the hole. Screw through the existing wall board into the wood piece to secure it. With the wood backer in place, you are now ready to position your patch and screw it into place.

When replacing larger pieces of sheet rock, consider the location of the studs. I take care not only to find the studs, but also to

determine the center of the studs at the left and right edges of the patch. I cut the existing board down the middle of these two studs so the newly created joints will fall on center of the studs.

Make sure all old fasteners are either removed or driven into the studs flush so the new gypsum board sits tightly against the studs. If your patch piece is a bit too tight, you can shave some off of the edges with a rasp or a Surform plane. Don't try to force the patch into place. A little gap in the drywall is not a problem.

Nailing and screwing off drywall takes a little finesse. You want to slightly dent the paper face without breaking through. Nail or screw heads left too high won't finish properly, and those driven too deeply won't hold the board. It's OK to make a slight dent in the paper face with your hammer, but don't get too carried away.

All seams in drywall should be covered with joint compound,

Cut the back paper face to finish separating the piece.

Attach the piece to the wall with drywall screws. Be careful not to break the paper face with the screw head

Add a thin layer of joint compound over the joint.

Apply joint tape over the first layer of joint compound.

Smooth the tape flat with the joint knife.

Apply another layer of joint compound over the joint tape.

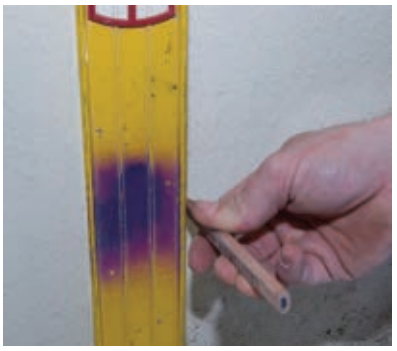
joint tape and more joint compound. Professional drywallers have special tools designed to dispense joint compound on both sides of a piece of joint tape. For small jobs, however, applying joint compound and then placing the dry joint tape over it will get the job done.

After two or three coats of joint compound over the tape and over the fastener heads, sand as needed to get the whole job smooth.

Next, apply texture. You can use joint compound in any of several patterns with trowels and joint knives for a plaster-like look, or you can spray-apply the texture.

The two most popular spray-on textures are orange peel and knock-down finish (see "Putting up Knockdown Texture" at www.extremehowto.com). Both of these textures can be applied with a hopper spray gun.

After the joint compound dries, sand it flat. Be careful not to get into the joint tape when sanding.



We used a level to mark the center of the stud on a recent water-damage drywall repair.

We cut up the center of two studs so the replacement piece and the adjacent boards can all be anchored on the studs.

Drywall nails are designed specifically for this application. The heads are very thin, which helps them recess for easy concealment. Making a slight dent with the hammer and without tearing the paper face of the gypsum board is the goal here.

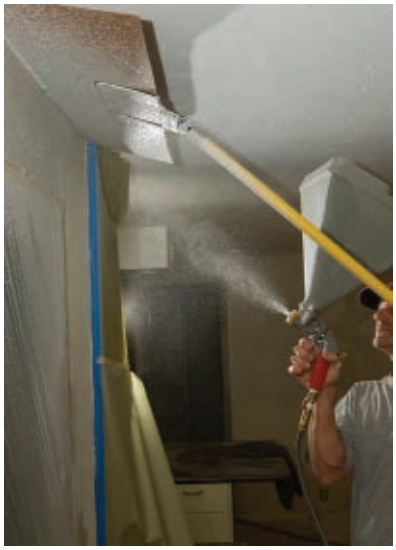
Don't overlap the vertical and horizontal pieces of joint tape unless you have a layer of joint compound between the two tape layers.

For small patch jobs you can get texture in an aerosol can, or you can use a stiff-bristle brush loaded with joint compound. Load the brush with compound, turn the brush bristles upward and place it about 8 inches from the wall. Drag your fingers over the tips of the bristles to spring load them so they rebound and shoot texture on the wall. Practice this brush technique on some scrap first. Experiment with different thicknesses of joint compound to get the desired results.

Most drywall repairs are doable for the adventuresome

do-it-yourselfer. Basic tools and supplies for drywall work are inexpensive, water cleanup is the order of the day, and most mishaps can be fixed with a little sanding and more joint compound. Don't be scared, get out there and fling some mud! EHT

You can buy joint compound in a box at your home improvement center. I load the compound directly into a mud tray and add a little water as needed for the right consistency.



Make sure everything is well masked off and drop cloths are in place before loading up the texture hopper. I have a helper man the shields for areas near the ceiling.

We use this Wal-Board texture-pro hopper gun for our drywall repairs. Air compressor requirements include 7 CFM at 25 psi for sustained use, but a smaller compressor can do a small repair job.

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Strut Like a Pro

Do-It-Yourself Shock/Strut Install Saves Owners Time and Money

By Bruce W. Smith

It wasn't to the point of needing a Dramamine patch behind the ear, but my 2002 Chevy TrailBlazer's ride and handling seemed to have become a lot more "boaty" over the past year. It wasn't unexpected: 67,000 miles, mostly over country roads and pot-hole-ridden city streets tends to hasten the wear and tear of any vehicle's suspension.

Shocks wear out about the same time as tires and at the same time-warping miniscule rate, so their demise lulls you into not even noticing they are shot until one day you suddenly realize something is not right and needs to be fixed. Now.

Most standard shocks lose their effectiveness around 15,000 miles. The higher-end gas-filled versions, like the Bilsteins under the four corners of my TrailBlazer, are good for around 50K. After that you might as well say they are just along for the ride—as were mine. They no longer control the vehicle when a big dip in the road swallows it up, nor do they quickly steady the wobbles, bounces, and shakes after crossing the railroad tracks, or help stabilize the movement added by that trailer hooked to the hitch.

Replacing shocks on a pickup or SUV is easy. A bolt on bottom and top are all that keep them in place. But replacing struts is another story; they normally require a trip to the repair shop or dealer where special tools and trained mechanics handle what becomes an expensive half-day task.

But we are going to take you step-by-step to show how you can R&R both the rear shocks and front struts (online) in half the time allowed in the flat-rate book, saving you the $50-$60/hour shop labor rate, paying a premium for OEM shocks, and the cost of a front-end alignment. All you need are the right tools and room to work.

When the job is done your GM SUV's ride and handling will be better than it was the day it came off the showroom floor.

A word of note about shocks/struts: OEM/factory shocks and struts do not always provide the best ride and handling. They can also be more expensive than "aftermarket" replacements. We know Bilstein changed the shock setup on their non-OEM struts and shocks for this application to provide what they think is a better suspension package, and we concur.

Editor's Note: *This replacement procedure is applicable to all 2002-2006 Chevy TrailBlazer, GMC Envoy, Olds Bravada, and Buick Rainer mid-size SUVs. The procedure may differ for other makes and models of vehicle. Refer to the manufacturer's recommendations.*

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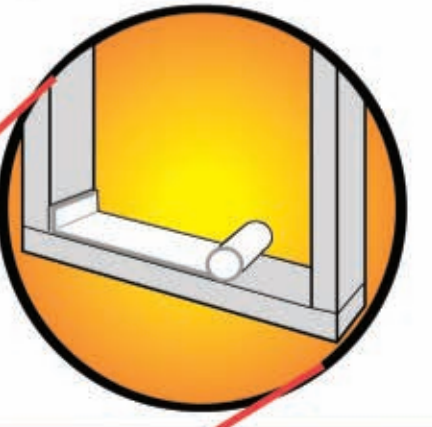

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STEP-BY-STEP
(REAR SHOCKS)

Lift the vehicle and safely secure it. We used a hoist for easiest access, but a floor jack and good jackstands can also be employed. Remove the rear wheels.

We placed an OTC 2018A 2-Ton Tripod Stand under the axle housing to support the side each shock is being R&R'd. (A floor jack will work the same way for those using jackstands instead of a hoist). Use an 18mm socket and box-end wrench to remove both the upper and lower shock mounting bolts.

Apply just enough lift on the tripod stand (or floor jack) to allow both the upper and lower shock bolts to slide out freely. The bottom mount might require a little nudge from a long screwdriver or small pry bar to slide out of the mounting bracket.

Bilstein is a big shock supplier to GM, including those found on the mid-size SUV's such as the TrailBlazer, Envoy and Bravada. But Bilstein's own replacement shocks have different valving and better overall ride control than the factory-spec shocks. So we used Bilstein's shocks instead of the GM replacement versions.

Before installing the new Bilsteins, note that the top mounting bracket utilizes a special "J"-clip/nut on the inward side. This clip can and may slip down just a fraction when you remove the shock. When the new shock is installed you will have to use your finger or thumb to hold the clip up so it aligns with the mounting bolt.

Install both the upper and lower bolts (supplied with the new shocks) and tighten.

Back off the pressure on the floorjack or tripod stand. Reposition the stand or floor jack to the opposite side and repeat the same steps.

After the new shocks are in place, dab a little Anti-Seize on each wheel stud. This ensures the lug nuts will be easy to remove the next go 'round.

Bolt the wheels back on, torque the lugnuts to the specs found in the owner's manual, and check the tire air pressure to make sure they are at the pressure indicated on the vehicle's door placard. That's it. Total time from start to finish: 30 minutes–tops. **EHT**

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Campbell Hausfeld's new 26-gallon compressor offers the homeowner many convenient new features. The 26-gallon tank is large for a portable compressor, but by mounting the compressor below the tank, Campbell Hausfeld lowers the center of gravity for a more balanced system that is stable when moving and when stationary. The unit's large capacity also means a quieter work area since the compressor does not cycle as frequently as smaller units. Campbell Hausfeld has added large pressure control knobs and pressure gauges, with detents at 5- to 10-PSI intervals that make it easy for the user to dial in the required pressure for the application. A separate air hose outlet allows quick inflation of tires, inflatable toys and floats. The separate outlet for inflation saves time in two ways. On compressor start-up, the inflation hose fills to 115 PSI before the tank itself begins to fill, and by having the second hose, inflation attachments can be left attached to the hose when you decide to use your air-powered tools. The 26-gallon model has a maximum pressure of 150 PSI, enough to power 17 types of air tools, including nailers, impact hammers and air wrenches. The motor offers 1.7 running horsepower, providing 3.8 SCFM at 90 PSI and 5.6 SCFM at 40 PSI. Visit www.chcompressors.com.

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InSoFast, LLC, introduces an innovative new product ideally suited for framing and insulating concrete walls, ceilings and floors in one simple step. This fast and easy-to-install panel is a 4-by-2-foot panel that is 2 inches thick and locks together to create an R-10 system. Comprised of closed-cell expanded polystyrene and embedded studs, InSoFast provides a secure attachment for drywall, siding or subflooring. Drainage channels on the back side of the panel keep moisture away from the drywall. An integrated network of chases allows for the easy installation of wiring after the panels are set in place, and even after the drywall is installed. Because the mold-resistant InSoFast is made of vapor semi-permeable EPS foam, the wall system is allowed to dry, making it a logical choice for concrete insulation. Visit www.insofast.com.

ZERO VOC'S IN KILZ CLEAN START PRIMER

Masterchem Industries, maker of Kilz brand products, now offers the KILZ Clean Start primer, a zero-VOC (volatile organic compound), high-performance interior/exterior water-based primer, sealer and stainblocker, perfect for DIY paint enthusiasts and professionals alike. The low-odor formula addresses indoor air quality concerns related to VOC's, while delivering the quality performance expected from other KILZ brand primers. In addition to its sealing and stainblocking power, starting a paint project with a quality primer like KILZ Clean Start primer allows for fewer top coats. It is intended for use on most interior and exterior surfaces, including woodwork, drywall, plaster, paneling, masonry, brick, painted metal and properly prepared glossy surfaces. Visit www.kilz.com.

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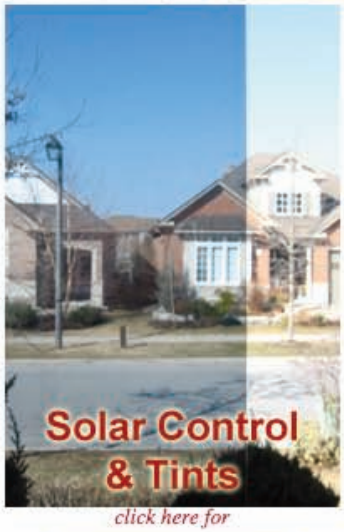

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–**Bob Heidenreich**, Owner The Deck Store, Apple Valley, MN

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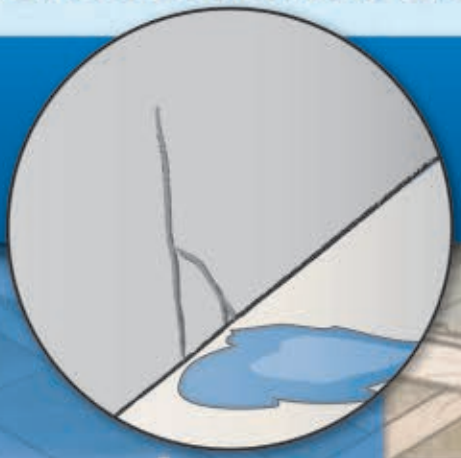

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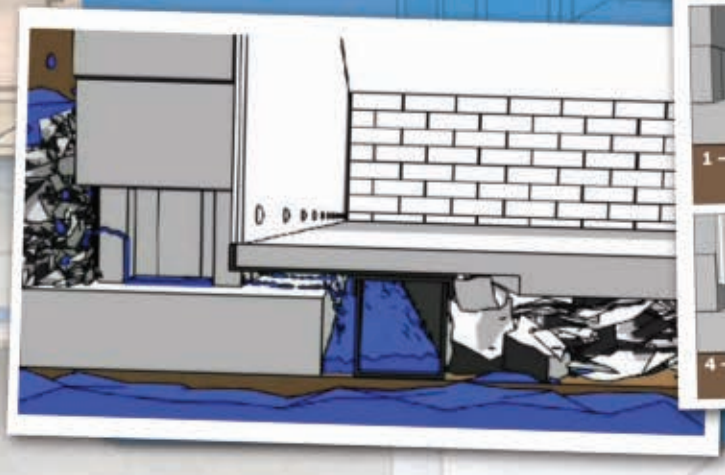

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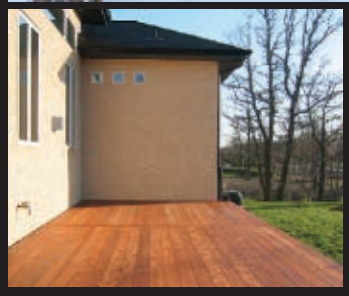

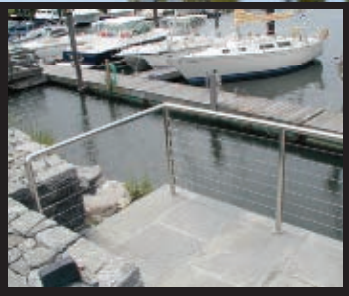

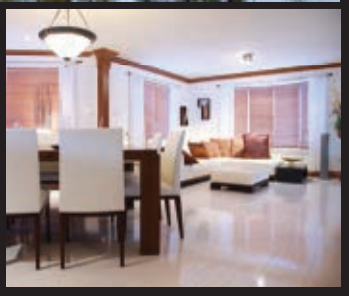

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